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ABSTRACT

This research investigated the effects of employing fixed, variable, and extended token exchange periods for back-ups on the completion and accuracy of daily assignments for a total fifth and sixth-grade class. The results indicated that, in general, a higher percentage of assignments was completed when the number of days between point exchanges was variable, and that performance was maintained when the number of school days between point exchanges was gradually increased. The overall accuracy on assignments was high, but variable and did not appear to be under the systematic control of the experimental procedures. Data for two selected pupils indicated that there were individual differences as to the effects of the various token (point) exchange procedures. Thus, the variable sequencing of the number of days should be an important consideration in any effort to maintain the positive effects of token-reinforcement systems within classroom settings. (Author/ED)

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COMPLETION RATES AND ACCURACY OF PERFORMANCE UNDER FIXED AND VARIABLE TOKEN EXCHANGE PERIODS [1]

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COMPLETION RATES AND ACCURACY OF PERFORMANCE UNDER FIXED AND VARIABLE TOKEN EXCHANGE PERIODS

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Manipulation of the delay period between the presentation of tokens and their exchange for back-up reinforcers has been suggested as a possible technique to increase the resistance to extinction of token reinforcement programs. (Kazdin and Bootzin, 1972; O'Leary and Becker, 1967; O'Leary and Drabman, 1971). Such a procedure would also attempt to increase the generalization of the behaviors to non-treatment (regular classroom) settings where rewards are typically dispensed in a delayed manner. O'Leary and Becker (1967) used such a procedure for elementary school children in an adjustment classroom. They reported that the delay period could be increased up to four days without a decrease in the instruction-following behavior of their pupils. McLaughlin and Malaby (1972) reported that variable delay periods were more effective in controlling assignment completion for a total class, than were fixed delay periods. However, since the mean number of days between the exchange of tokens for back-ups was 4.25 in the variable delay condition, while the fixed delay period was 5.00

school days, the effectiveness of the variable delay periods may be attributable to the lower mean number of days between point exchanges rather than the variable sequencing of exchange periods.

The purposes of this experiment were to: (a) compare the effects of fixed vs. variable delay periods between the exchange tokens for back-ups on assignment completion in language, math, handwriting, and spelling for the total class, keeping the sequence and the mean number of days between exchange periods the same; (b) determine the effects of such delay periods would have on the quality of pupil performance; and (c) examine the effects of extending the delay period on the completion rate and accuracy of daily assignments.

Method

Subjects and Setting

The token (point) system was the same as described previously by McLaughlin and Malaby (1971; 1972). Points were earned for appropriate classroom behavior and lost for inappropriate behavior. The main emphasis of the token economy was on assignment completion and accuracy. Pupils recorded their points on a chart and the teacher recorded such data in the gradebook. Points were accumulated for varying periods of time before they could be exchanged for privileges available in the school environment. Once the pupils exchanged their points for privileges (back-ups), the privileges were kept until the next exchange took place. The behaviors which earned and lost points for the entire experiment were the same as those employed in a previous report

(McLaughlin and Malaby, 1972). A list of privileges used in the classroom can be seen in Table 1.

Insert Table 1 about here

Minor changes had to be made in the token system, such as adding or dropping a privilege or two, and redesigning the pupils' point charts. This was the third year of operation for the token system and inflation had occurred. That is, the pupils earned more points and had many points left over after they had purchased the privileges. Phillips, Phillips, Fixsen, and Wolf (1971) also reported such a problem with their token system at Achievement Place. In order to combat this inflationary trend, a lottery system was developed with the aid of the pupils in the class. Certain privileges in the room, such as being on a committee, monitoring the tables in the lunch room, and watching the lunch line were highly desired, but only a few pupils in the room could possibly take part in these activities. Through the lottery system the pupils purchased numbers (1 to 300) with their points. The privileges that were purchased by the lottery system procedure can be seen in Table 1. If special jobs cost 20 points, a pupil with 100 points could buy five numbers. After all of the pupils had purchased their back-ups, the teacher selected pupils to draw numbers out of a can. The pupil whose number was the same or the closest to the number drawn was awarded the privilege. Privileges such as special jobs required that numbers be drawn when the need

arose. Such privileges as watching the lunch line were given on a daily basis. The class was told that the more numbers they purchased for a given privilege, the greater the chances they could participate in the privileged behaviors. The lottery system was in effect for the total school year.

The overall functioning of the classroom procedures was the same as in a previous report (McLaughlin and Malaby, 1972). The assignments were placed on the board, and the pupils were expected to complete them by the following day. Assignments were usually made daily in math and language; twice per week in spelling; and three times per week in handwriting. Assignments came from the various curricula employed in the school district.

Dependent Variables

There were two dependent variables. The first was the percent of completed assignments in math, language, spelling, and handwriting. A completed assignment was defined as having all the problems or tasks completed when the assignment was due, usually the next school day. Assignments could be made up during the period that the class was earning points that would be later exchanged for privileges and still be defined as complete. Assignments that were incomplete were usually made up the same day. Only five percent of the assignments that were incomplete were made up by the class. Assignments were kept as comparable as possible across experimental conditions. The percent of assignments completed was calculated by dividing the number of completed assignments by the number of pupils present. The second dependent variable was the accuracy of pupil performance on each

assignment. This was calculated by taking the number of correct problems for all the pupils and dividing by the number of pupils times the number of problems possible. A correct response was defined as such if it matched the answer in the teacher's edition of the textbooks.

Reliability

The check of the reliability of measurement was made on the 100 papers selected at random by a judge from a stack of all the papers saved by the teacher after each assignment. Four teachers not involved in the study acted as judges. Each assignment was judged as to its completeness and accuracy by comparing it to a written key. Their comparisons were then compared to a written record made by the teacher in the gradebook. Agreement between the four judges and the teacher's recording was 100 percent for completion of work and for accuracy.

Experimental Conditions

There were six token exchange conditions. They are presented in the order of their occurrence.

Fixed Period I (FP-I). During this condition, the class was allowed to exchange their points for privileges at the end of every five school days. Pupils also kept their privileges for five school days. The class was informed of this exchange procedure the first day of the experiment. This condition lasted for five point exchanges (25 school days).

Variable Period I (VP-I). On the first day of this condition the class was informed that points would no longer be exchanged

for privileges after every five school days. The teacher told the class that he did not know how long it would be until they could exchange their points; it may be three days or seven days. The pupils were told to add up their points the afternoon prior to the day that the exchanges took place. The number of days between point exchanges was 4, 7, 5, 6, and 3 (involving 25 days). The prices of the various privileges were adjusted depending on the number of days between point exchanges, so prices were comparable no matter how many days had elapsed.

Fixed Period II (FP-II). This was a replication of the first Fixed Period condition. The class was informed that they could again exchange their points for privileges after every five school days. This condition lasted for three point exchanges (15 days).

Variable Period II (VP-II). This was a replication of the Variable Points I condition. The class was informed of this change in procedures the first day that it took effect. It lasted for five point exchanges involving 4, 7, 5, 6, and 3 days (totaling 25 school days).

Variable Period III (VP-III). The teacher informed the class that he did not know how many days would elapse before they could exchange their points for privileges, but it would be more than seven school days. The number of days between point exchanges for privileges was 8, 10, 12, 15, and 21 (totaling 66 days).

Fixed Period III (FP-III). The teacher again informed the class that they could exchange their points after every five school

days. This condition lasted for two five-day periods and ended with the closing of school.

Results

Figure 1 shows the percent assignments completed by the class in each of the experimental conditions. During the first

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Insert Figure 1 about here

Fixed Period condition (FP-I), the class completed from 88 to 100 percent of their daily assignments. As figure 1 reveals, there was variable performance in each of the four subject-matter areas (math, language, spelling, and handwriting). With the introduction of the variable exchange period (VP-I), the assignment completion increased and became stable (range 96 to 100%).

A return to the fixed five day exchange period (FP-II), generated variable assignment completion (range 86 to 100%). With the reintroduction of the variable period delay condition (VP-II), the percent of assignment completion was high and stable and was maintained when the number of days between point exchanges was gradually increased (VP-III). This perfect performance was maintained for a total of 66 school days.

The reapplication of the fixed five day exchange condition (FP-III), resulted in variable percents of assignment completion in handwriting and language (range 88 to 100%). In math, only one incomplete assignment was recorded. Since the pupils had completed all of the assignments in the spelling texts, no data were available for this condition.

Figure 2 shows the effects of the various token exchange conditions for two pupils selected on the basis of a high percent

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Insert Figure 2 about here

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of assignment completion (S-2) and a low percent of assignment completion (S-1) in math. The data indicate the variable sequencing of token exchanges (VP-I, II, III) had the greatest effect on the pupil (S-1) with a low percent of assignment completion. Data for the median pupil were not presented because of a high percent of assignment completion in math. The data for math reflect each pupil's performance in the other subject-matter areas (language, spelling, and handwriting).

The mean percent correct in math, language and spelling can be seen in Figure 3. Accuracy was extremely variable across

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Insert Figure 3 about here

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assignments. The overall means (solid horizontal bars) indicated that accuracy tended to remain somewhat stable or increase throughout the experiment except in language. Overall means ranged from 78 to 94%.

Discussion

The results demonstrated that the variable exchange contingency (VP-I, II) generated higher and more stable performance for assignment completion than did fixed period exchange conditions (FP-I, II, III). Also, the number of days within the

variable period exchange condition (VP-III) could be increased to 21 school days without a decrement in performance for assignment completion.

The results of this research replicate our previous findings (McLaughlin and Malaby, 1972) which indicated higher and more stable performance under variable rather than fixed token exchange periods. This was true in this research when the mean number of days between such exchanges was the same (five days).

Accuracy of performance was not affected in any systematic manner by the experimental procedures, although it remained fairly high throughout the entire experiment. A possible explanation was that assignments were of the standard textbook variety. With a semi-programmed curriculum such as SRA Reading Laboratories, the effects of the various exchange conditions on accuracy might have been more apparent.

Pupil feedback as to the token system and the various delay periods was obtained at the termination of the experiment. All of the pupils enjoyed the token system. An interview with a pupil (S-1) who had variable rates of assignment completion revealed he tended to not complete all his work until the day that points were to be exchanged for back-ups (FP-I, II, III). When the day came, he simply had too much work to make up, so it was not completed. He informed the first author that this was not the case when he was unaware of the day the exchange would take place (VP-I, II). During the extended variable token exchange delay condition (VP-III), the pupil reported that he completed his work because he did not want to lose the classroom privileges for such long periods of time. Therefore, it appeared

that this pupil completed more of his work: (a) when he did not know the day that points were to be exchanged for privileges (VP-I, II), and (b) to avoid losing the classroom privileges for extended periods of time (VP-III). Similar information was obtained from other pupils, who had variable assignment completion.

The variable performance recorded assignment completion may be considered small, but increasing and maintaining assignment completion on near perfect levels should be an important objective for teachers. The results for the pupil with variable rates of assignment completion (S-1) revealed that for some members of the class, assignment completion was low. The manipulation of the token exchange periods was a minor task which came to control and maintain a large amount of behavior in the classroom. Such a procedure should be given consideration by those interested in controlling assignment completion by a token system. The controlling of academic completion for great lengths of time was worthy of note. Such control appeared to be fairly specific in terms of which exchange period was used. The procedure did appear to have merit as a possible technique to maintain the positive effects of a token reinforcement program within the same setting, thereby increasing the resistance to extinction of such effects.

The extended delay period (VP-III) where pupils earned or lost points for longer and longer periods of time is analogous to the regular classroom setting. In the regular classroom

pupils typically engage in large amounts of behavior over extended periods of time before consequences such as grades, report cards, failure notices, etc., are levied. It appears that gradually extending the delay period between token exchanges may be a possible technique to fade from tokens to no tokens. The next logical step for future research would be to gradually increase the delay period while at the same time decreasing the number of tokens until the entire system was withdrawn.

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Table 1

Privileges

Privilege	Cost for a Day[a]
1) Cleaning the rat cages	(2)
2) Talking with permission	(5)
3) Being on a committee[b]	(2)
4) Going to the library during class time	(3)
5) Writing questions on the board for the teacher	(2)
6) Chewing gum on Thursdays	(5)
7) After school sports	(12)
8) Watching the lunch line[b]	(3)
9) Checking out P.E. equipment for the weekend	(6)
10) Using the adding machine[b]	(4)
11) Recess	(6)
12) Monitoring a table in the lunch room[b]	(6)
13) Friday recess	(5)
14) Seeing the animals	(3)
15) Special projects[b]	(6)

a the privileges varied in cost depending upon the number of days between point exchanges

b these privileges were sold on a lottery basis

Footnotes

1. The authors would like to thank Warren Cook, principal, for allowing this research to take place in his school. The first author would like to express his appreciation to Drs. Eugene Ramp, Don Jackson, Dean Fixsen for their critical comments on an earlier draft of this paper. A special note of thanks to Joanne Hurst and Rosemary McLaughlin for typing and collating this manuscript. Preparation of this research was supported in part by a grant (OEG-0-8-522422-4433) to the University of Kansas Support and Development Center for Follow Through.

2. Now at the University of Kansas. Requests for reprints should be sent to T. F. McLaughlin, Department of Human Development, The University of Kansas, Lawrence, Ks. 66045.

Figure Captions

Fig. 1. The assignment completion in math, language, handwriting and spelling for each of the experimental conditions. P-I, II, and III--points were exchanged for privileges every five school days; VP-I, and II--points were exchanged for privileges after a variable number of days with a five-day mean had elapsed; VP-III--the number of school days between exchanges for privileges was gradually increased to 21 school days.

Fig. 2. The percent of assignments completed in each experimental condition by two pupils judged to be one of the poorest (S-1) and best (S-2) at assignment completion.

Fig. 3. The percent correct for each assignment in math, language, and spelling. Solid horizontal lines indicate overall means in each condition.

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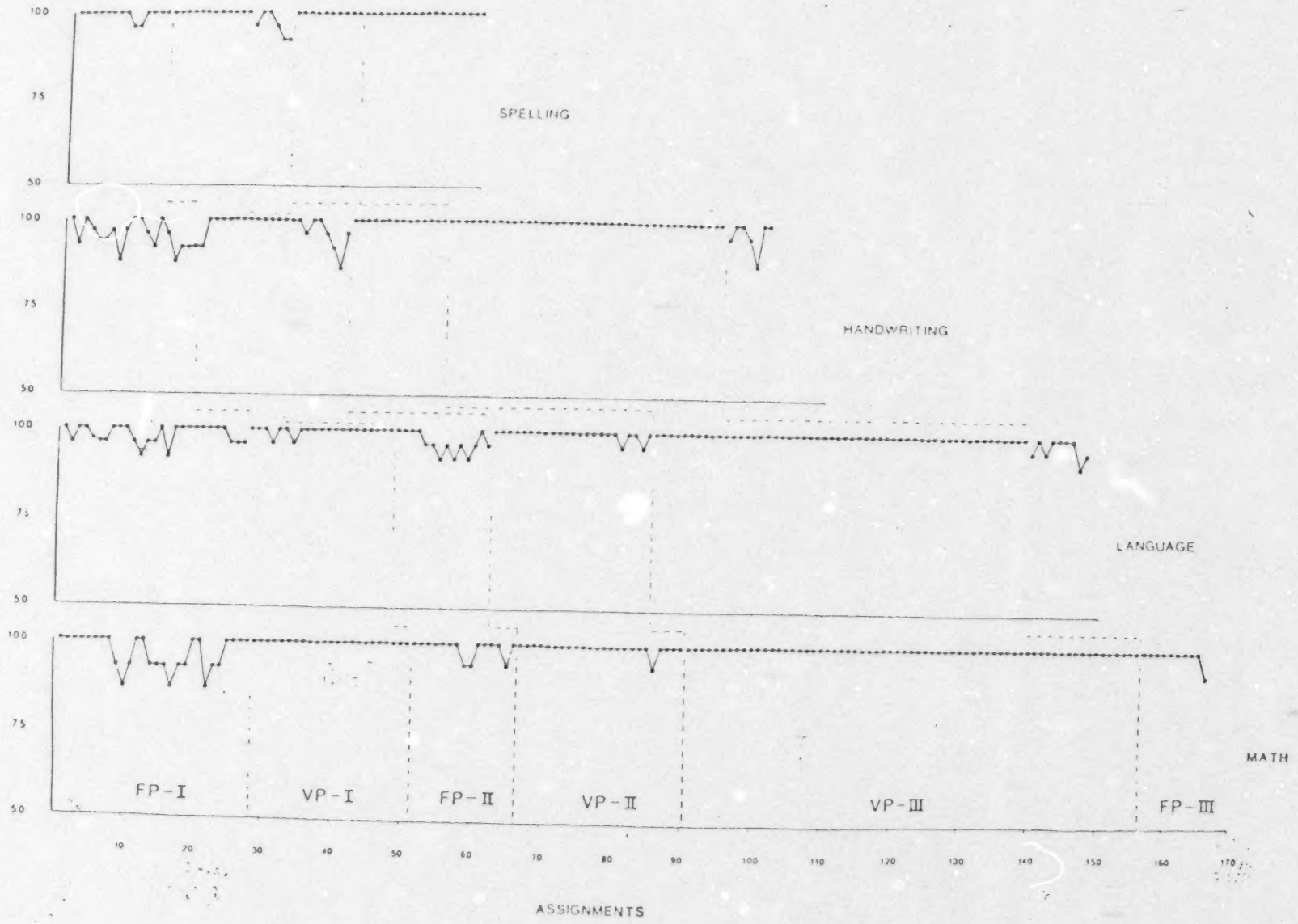

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